ALGEBRA AND FUNCTIONS

The following ten California mathematics academic content standards from the Algebra and Functions strand are assessed on the CAHSEE by 17 test questions and are represented in this booklet by 30 released test questions. These questions represent only a few of the ways in which these standards may be assessed on the CAHSEE.

GRADE 7 — ALGEBRA AND FUNCTIONS	
Standard Set 1.0	**Students express quantitative relationships by using algebraic terminology, expressions, equations, inequalities, and graphs:**
1.1	Use variables and appropriate operations to write an expression, an equation, an inequality, or a system of equations or inequalities that represents a verbal description (e.g., three less than a number, half as large as area A).
1.2	Use the correct order of operations to evaluate algebraic expressions such as $3(2x + 5)^2$.
1.5	Represent quantitative relationships graphically and interpret the meaning of a specific part of a graph in the situation represented by the graph.
Standard Set 2.0	**Students interpret and evaluate expressions involving integer powers and simple roots:**
2.1	Interpret positive whole-number powers as repeated multiplication and negative whole-number powers as repeated division or multiplication by the multiplicative inverse. Simplify and evaluate expressions that include exponents.
2.2	Multiply and divide monomials; extend the process of taking powers and extracting roots to monomials when the latter results in a monomial with an integer exponent.
Standard Set 3.0	**Students graph and interpret linear and some nonlinear functions:**
3.1	Graph functions of the form $y = nx^2$ and $y = nx^3$ and use in solving problems.
3.3	Graph linear functions, noting that the vertical change (change in *y*-value) per unit of horizontal change (change in *x*-value) is always the same and know that the ratio ("rise over run") is called the slope of a graph.
3.4	Plot the values of quantities whose ratios are always the same (e.g., cost to the number of an item, feet to inches, circumference to diameter of a circle). Fit a line to the plot and understand that the slope of the line equals the quantities.
Standard Set 4.0	**Students solve simple linear equations and inequalities over the rational numbers:**
4.1	Solve two-step linear equations and inequalities in one variable over the rational numbers, interpret the solution or solutions in the context from which they arose, and verify the reasonableness of the results.
4.2	Solve multistep problems involving rate, average speed, distance, and time or a direct variation.

53. Which of the following inequalities represents the statement, "A number, x, decreased by 13 is less than or equal to 39"?

A $13 - x \geq 39$

B $13 - x \leq 39$

C $x - 13 \leq 39$

D $x - 13 < 39$

M03049

54. A shopkeeper has x kilograms of tea in stock. He sells 15 kilograms and then receives a new shipment weighing $2y$ kilograms. Which expression represents the weight of the tea he now has?

A $x - 15 - 2y$

B $x + 15 + 2y$

C $x + 15 - 2y$

D $x - 15 + 2y$

M00110

55. Divide a number by 5 and add 4 to the result. The answer is 9.

Which of the following equations matches these statements?

A $4 = 9 + \frac{n}{5}$

B $\frac{n}{5} + 4 = 9$

C $\frac{5}{n} = 4$

D $\frac{n+4}{5} = 9$

M00050

56. In a certain room, the number of chairs, c, is equal to 3 times the number of tables, t.

Which equation matches the information?

A $3 \bullet c = t$

B $3 \bullet t = c$

C $3 \bullet c = 3 \bullet t$

D $c \bullet t = 3$

M00104

57. If $n = 2$ and $x = \frac{1}{2}$, then $n(4 - x) =$

A 1

B 3

C 7

D 10

M00034

58. If $h = 3$ and $k = 4$, then $\frac{hk + 4}{2} - 2 =$

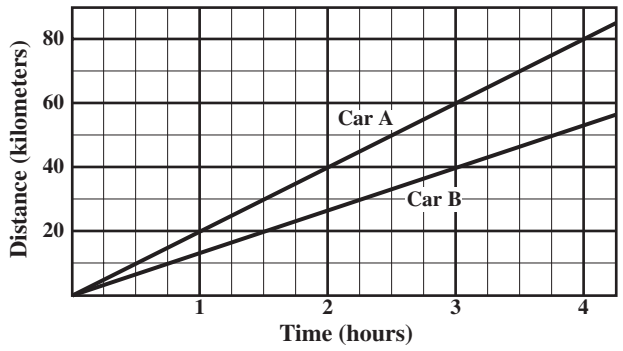
A 6

B 7

C 8

D 10

M00052



59. After three hours of travel, Car A is about how many kilometers ahead of Car B?

A 2

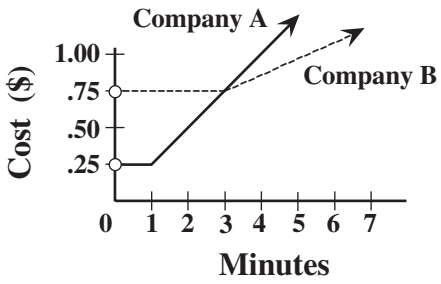
B 10

C 20

D 25

M00066

60. The cost of a long distance call charged by each of two telephone companies is shown on the graph below.



Company A is less expensive than Company B for

A all calls.

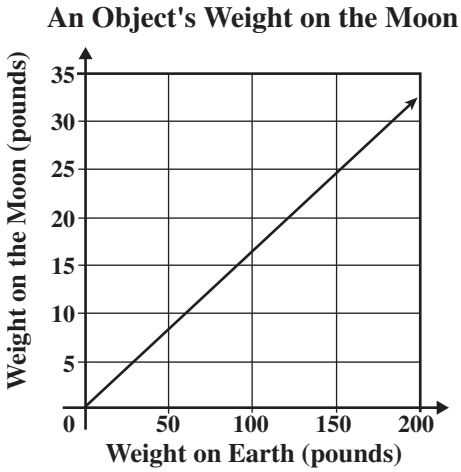
B 3 minute calls only.

C calls less than 3 minutes.

D calls longer than 3 minutes.

M02840

61. The graph below compares the weight of an object on Earth to its weight on the Moon.



What is the approximate weight on the Moon of an astronaut who weighs 120 pounds on Earth?

A 15 pounds

B 20 pounds

C 25 pounds

D 30 pounds

M10668

62. $x^3y^3 =$

A $9xy$

B $(xy)^6$

C $3xy$

D $xxxyyy$

M02879

63. What does x^5 equal when $x = -2$?

A -32

B -10

C $-\frac{1}{32}$

D 32

M12857

64. Which of the following is equivalent to $(6x-2)(6x-2)(6x+2)$?

A $(6x-2)^3$

B $(6x+2)^3$

C $2(6x-2)(6x+2)$

D $(6x-2)^2\,(6x+2)$

M12845

65. $\sqrt{4x^4} =$

A 2

B $2x$

C $4x$

D $2x^2$

M03067

66. Simplify the expression shown below.

$$(5x^2z^2)(8xz^3)$$

A $40x^2z^6$

B $40x^3z^5$

C $40x^3z^6$

D $40x^5z^5$

M02009

67. Simplify the expression shown below.

$$(6a^4bc)(7ab^3c)$$

A $13a^4b^3c$

B $13a^5b^4c^2$

C $42a^4b^3c$

D $42a^5b^4c^2$

M02109

68. Which expression is equivalent to $7a^2b \cdot 7bc^2$?

A $14a^2b^2c^2$

B $49a^2bc^2$

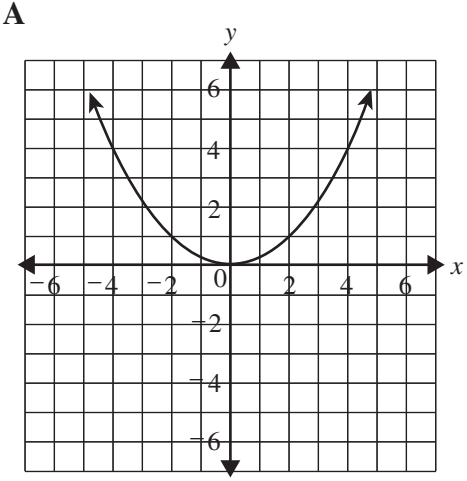
C $49a^2b^2c^2$

D $343a^2b^2c^2$

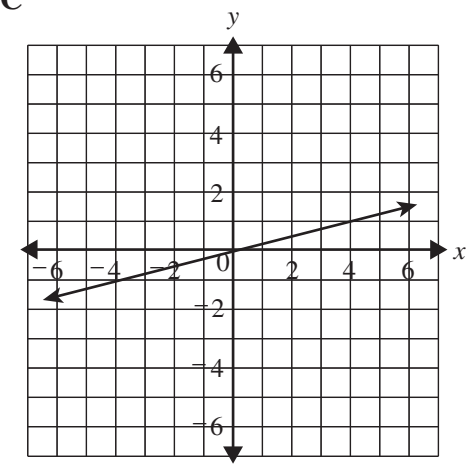
M12872

69. Which of the following is the graph of $y = \frac{1}{4}x^2$?

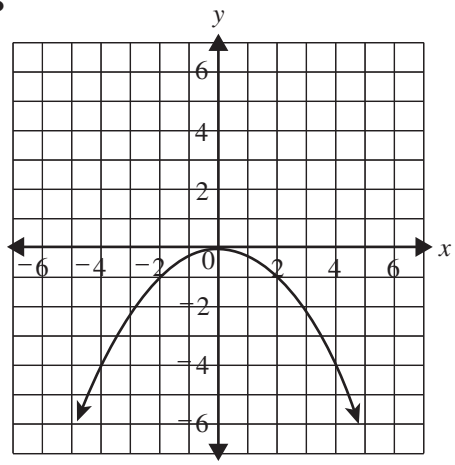
A



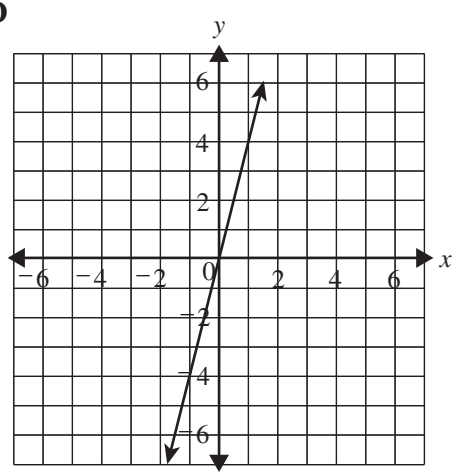
C



B



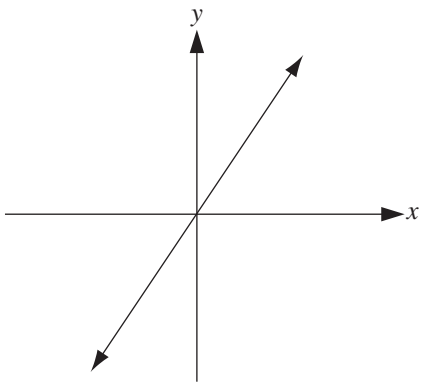
D



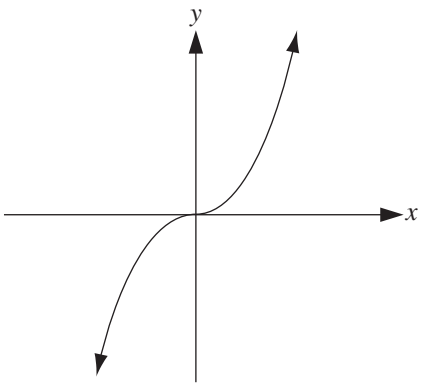
M03210

70. Which of the following could be the graph of $y = x^3$?

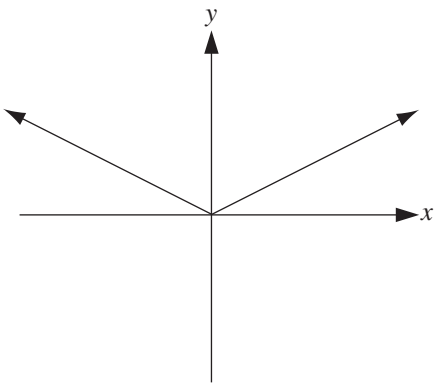
A



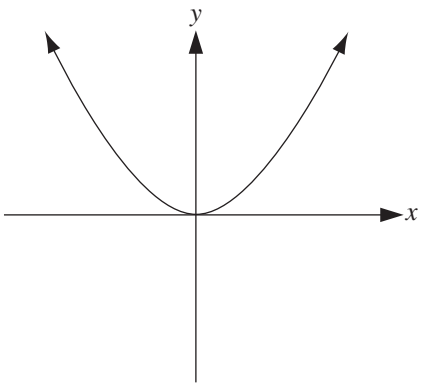
C



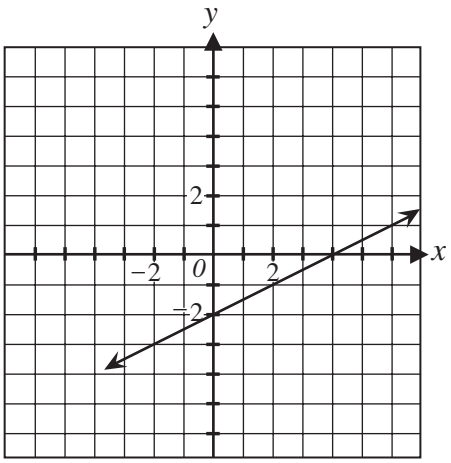
B



D



M02200



71. What is the slope of the line shown in the graph above?

A -2

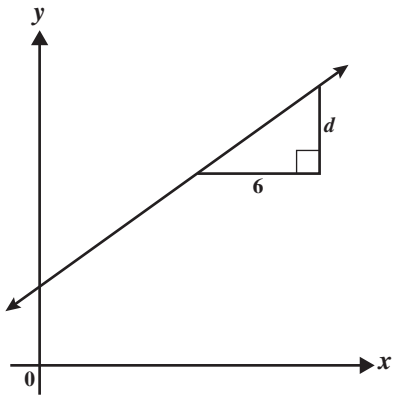
B $-\frac{1}{2}$

C $\frac{1}{2}$

D 2

M02556

72. The slope of the line shown below is $\frac{2}{3}$.



What is the value of *d*?

A 3

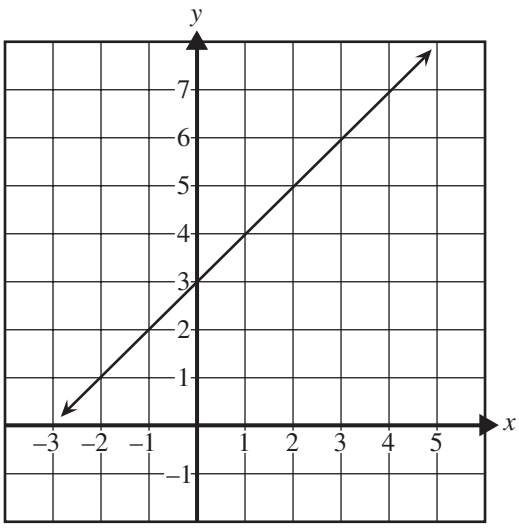
B 4

C 6

D 9

M02078

73. What is the equation of the graph shown below?



A $y = x - 1$

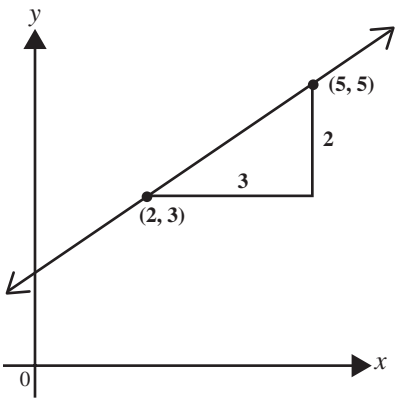
B $y = x + 1$

C $y = x + 3$

D $y = x - 3$

M02035

74. What is the slope of the line below?



A $-\frac{3}{2}$

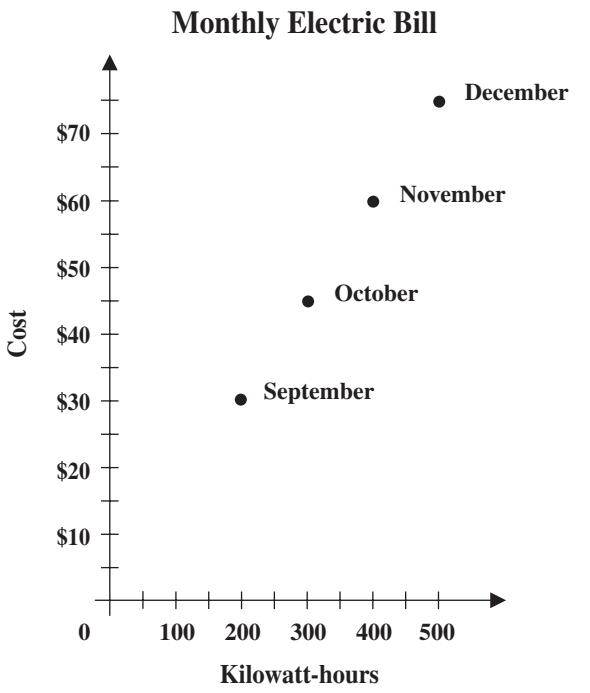
B $-\frac{2}{3}$

C $\frac{2}{3}$

D $\frac{3}{2}$

M02077

75. The graph below shows Francine's electric bill for 4 different months. What is the price per kilowatt-hour of Francine's electricity?



A $0.15

B $0.30

C $1.50

D $6.67

M02681

76. In the inequality $2x + \$10{,}000 \geq \$70{,}000$, x represents the salary of an employee in a school district. Which phrase most accurately describes the employee's salary?

A At least $30,000

B At most $30,000

C Less than $30,000

D More than $30,000

M02621

77. Solve for x.

$$2x - 3 = 7$$

A –5

B –2

C 2

D 5

M02771

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78. Solve for n.

$$2n + 3 < 17$$

A $n < 2$

B $n < 3$

C $n < 5$

D $n < 7$

M02040

79. The owner of an apple orchard ships apples in boxes that weigh 2 kilograms (kg) when empty. The average apple weighs 0.25 kg, and the total weight of a box filled with apples is 12 kg. How many apples are packed in each box?

A 14

B 40

C 48

D 56

M10327

80. Stephanie is reading a 456-page book. During the past 7 days she has read 168 pages. If she continues reading at the same rate, how many more days will it take her to complete the book?

A 12

B 14

C 19

D 24

M00380

81. Robert's toy car travels at 40 centimeters per second (cm/sec) at high speed and 15 cm/sec at low speed. If the car travels for 15 seconds at high speed and then 30 seconds at low speed, what distance would the car have traveled?

A 1050 cm

B 1200 cm

C 1425 cm

D 2475 cm

M10748

82. Sara can ride her bicycle 3 miles in 15 minutes. At this rate, how many miles can she ride her bicycle in 50 minutes?

A 5

B 10

C 15

D 20

M12177

Question Number	Correct Answer	Standard	School Year of Exam
53	C	7AF1.1	2001-2002
54	D	7AF1.1	2001-2002
55	B	7AF1.1	2000-2001
56	B	7AF1.1	2000-2001
57	C	7AF1.2	2002-2003
58	A	7AF1.2	2000-2001
59	C	7AF1.5	2001-2002
60	C	7AF1.5	2000-2001
61	B	7AF1.5	2004-2005
62	D	7AF2.1	2001-2002
63	A	7AF2.1	2003-2004
64	D	7AF2.1	2004-2005
65	D	7AF2.2	2001-2002
66	B	7AF2.2	2000-2001
67	D	7AF2.2	2000-2001
68	C	7AF2.2	2004-2005
69	A	7AF3.1	2002-2003
70	C	7AF3.1	2000-2001
71	C	7AF3.3	2001-2002
72	B	7AF3.3	2001-2002
73	C	7AF3.3	2000-2001
74	C	7AF3.3	2000-2001
75	A	7AF3.4	2003-2004
76	A	7AF4.1	2001-2002
77	D	7AF4.1	2001-2002
78	D	7AF4.1	2000-2001
79	B	7AF4.1	2003-2004
80	A	7AF4.2	2001-2002
81	A	7AF4.2	2003-2004
82	B	7AF4.2	2004-2005